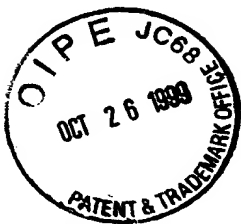


Reference No.71319

Mailing No.171533

Mailing Date August 31, 1999



Notice of Reason for Rejection

Number of Patent Application: JP-A-10-312368

Drafting Date of the Action: August 4, 1999

Examiner of the Patent Office: TAKAMATSU, Daiji 9415 2P00

Agent for Applicant: Mr. KURIHARA, Hiroyuki

Applied Provisions of the Statute: Article 36

The present application should be rejected for reason under mentioned. In case of any opinions, a response may be filed within sixty (60) days from the mailing date of this Action.

RECEIVED

OCT 28 1999

Reasons

TECHNOLOGY CENTER 2800

This application does not satisfy the requirements of Item 1 or 2 of Paragraph 6 of Article 36 of the Japanese Patent Laws in the following points.

Remarks

1. Since claim 23 states "The ink jet type recording head as set forth in any of claims 1 to 22, characterized in that said lower electrode comprises said compressed film", but claim 21 states "in any of claims 13 to 20, said lower electrode comprises a film having tensile stress", claim 21 and each of claims depending from claim 21 are inconsistent.

2. Claims 50 and 52 respectively state "deformed in convex"

and "bent in convex", but [0210] through [0215] which seem to explain the embodiment of claim 50 do not describe "deformed in convex". [0225] through [0230] which seem to explain the embodiment of claim 52 state "deformed in convex" but does not state "bent in convex". In consequence, the descriptions are not unified and accordingly the structure is not clear.

3. In case the embodiment of claim 50 corresponds to [0210] through [0215], "deformed" of claim 50 may be taken as the same meaning as "removed" of other claims, but claim 50 states "in any of claims 1 to 49, said vibrating plate is deformed in convex toward an outside from said pressure generating chamber", while claim 13 states "in any of claims 1 to 12, said compressed film composes at least one part of the elastic film composing at least one part of said vibrating plate". Claim 3 states "the compressed film is eliminated in at least one part in the thickness direction at the only part following the edge of said pressure generating chamber at both sides in the width direction of said piezoelectric element." Further claim 44 (claim 43 quoted by said claim 44 depends from claim 13) states "said elastic film is eliminated in at least one part in the thickness direction at the only part following the edge of said pressure generating chamber at both sides in the width direction of said piezoelectric element".

So, the structure where the compressed film composing the elastic film is eliminated in convex toward the outside from the pressure generating chamber as [Fig.22], is, when claim 50 quotes claim 13 depending from claim 3 or claim 44 depending from claim 13, contradictory to the structure which is "eliminated in at least one part in the thickness direction at

the only part following the edge of said pressure generating chamber of the elastic film composing the vibrating plate" (the explanation of the embodiment 12 described in [0210] through [0215] is not contradictory because it does not quote claim 3 or 44).

Thus, the invention in claim 23 is not definite. In addition, the invention in claims 50 or 52 is not definite, otherwise not the invention described in "Detailed Description of the Invention".

With respect to invention or inventions set forth in claim or claims other than claims pointed out in this Action, any rejecting reason is not found at the present time. In case a rejecting reason is found, that rejecting reason shall be noticed.

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Record of searching for prior art technical reference

Searched Field	IPC 6th Edition	B41J 2/045
		B41J 2/055
		B41J 2/16

Prior Art Technical References	JP-A- 4-187411
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JP-A- 5- 84904

JP-A- 7-178906

JP-A-10-100421

None of them explicitly describes stresses different in the orientation of stresses. But such inventions are described that the partial thickness is varied by the laminating

directions or etching so as to produce specific forms of the vibrating plate or the piezoelectric element, so that the balance of the whole stress is rendered to be at destined values.

This record of searching for prior art technical reference does not constitute any rejecting reason.

If you wish to inquire about the rejecting reason, or you wish personal interview with the Examiner, please contact the following communication of the Examination Section.

The Examination 2nd Section of the Patent Office, Copies and Printers TAKAMATSU, Daiji

Tel; 03(3581) 1101 (Ex.) 3261 / Fax; 03(3580) 6902

整理番号 71319

発送番号 171533

発送日 平成11年 8月31日 1 / 3

拒絶理由通知書

特許出願の番号	平成10年 特許願 第312368号
起案日	平成11年 8月 4日
特許庁審査官	高松 大治 9415 2P00
特許出願人代理人	栗原 浩之 殿
適用条文	第36条

この出願は、次の理由によって拒絶をすべきものである。これについて意見があれば、この通知書の発送の日から60日以内に意見書を提出されたい。

理 由

この出願は、特許請求の範囲の記載が下記の点で、特許法第36条第6項第1号または第2号に規定する要件を満たしていない。

記

1. 請求項23には、「請求項1～22の何れかにおいて、前記下電極が前記圧縮膜からなることを特徴とするインクジェット式記録ヘッド」と記載されているが請求項21には、「請求項13～20の何れかにおいて、前記下電極が、引張応力を有する膜からなり」と記載されているから、請求項21及び請求項21を引用する各請求項の記載と矛盾する。

続葉有

続 葉

2. 請求項50、請求項52にはそれぞれ「凸に変形」、「凸に撓んで」と記載されているが、請求項50の実施形態の説明であると思われる【0210】～【0215】には「凸に変形」の記載はない。また、請求項52の実施形態の説明であると思われる【0225】～【0230】には「凸に変形」と記載されているが「凸に撓んで」との記載が無い。よって、記載が統一されておらず構成が不明である。

3. 請求項50の実施形態が【0210】～【0215】であるとする、請求項50の「変形」は、他の請求項の「除去」と同様の意味であると解されるところ、請求項50には、「請求項1～49の何れかにおいて、前記振動板が、前記圧力発生室から外側に向かって凸に変形している」と記載されているのに対して、請求項13には、「請求項1～12の何れかにおいて、前記圧縮膜が、前記振動板の少なくとも一部を構成する弾性膜の少なくとも一部を構成する」と記載されている。そしてまた、請求項3には、「圧縮膜は、前記圧電素子の幅方向両側で前記圧力発生室の縁部に沿った部分のみで厚さ方向の少なくとも一部が除去されている」と、また、請求項44（該請求項が引用する請求項43が請求項13を引用する）には、「前記弾性膜は、前記圧電素子の幅方向両側で前記圧力発生室の縁部に沿った部分のみで厚さ方向の少なくとも一部が除去されている」と記載されている。

そうしてみると、弾性膜を構成する圧縮膜を【図22】のように圧力発生室から外側に向かって凸に除去する構成は、請求項50が請求項3を引用する請求項13または請求項13を引用する請求項44を引用する場合に「振動板を構成する弾性膜の圧力発生室の縁部に沿った部分のみで厚さ方向の少なくとも一部が除去」される構成と矛盾する（【0210】～【0215】に記載された実施形態12の説明は請求項3または請求項44を引用しない形態であるから矛盾していない）。

よって、請求項23に係る発明は明確でない。また、請求項50、52に係る発明は、明確ではないか発明の詳細な説明に記載したものでない。

この拒絶理由通知書中で指摘した請求項以外の請求項に係る発明については、現時点では、拒絶の理由を発見しない。拒絶の理由を新たに発見された場合には拒絶の理由が通知される。

続 葉

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先行技術文献調査結果の記録

- ・調査した分野   IPC第6版   B41J   2/045  
                                  B41J   2/055  
                                  B41J   2/16
- ・先行技術文献   特開平   4-187411号公報  
                          特開平   5-   84904号公報  
                          特開平   7-178906号公報  
                          特開平10-100421号公報

いずれも応力の向きが異なるか応力に関する明確な記載がないが、積層方向やエッチング等による部分的な厚さの変更により、振動板や圧電素子を特定の形状とすることで、全体の応力のバランスを所望の値にした発明が記載されている。

この先行技術文献調査結果の記録は、拒絶理由を構成するものではない。

また、この拒絶理由通知の技術的内容について、不明な点がある場合、または、この案件について面接を希望される場合は、以下まで連絡されたい。

特許庁審査第2部   印刷・プリンター   高松   大治

TEL; 03(3581)1101(内)3261 / FAX; 03(3580)6902



## JAPANESE PATENT OFFICE

## PATENT ABSTRACTS OF JAPAN

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B41J 2/045  
B41J 2/055

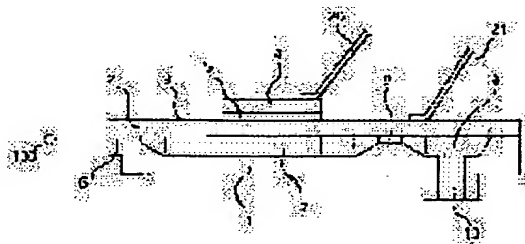
(21)Application number: 03249176 (71)Applicant: SEIKO EPSON CORP  
(22)Date of filing: 27.09.1991 (72)Inventor: KOIKE HISAYUKI  
MUKOYAMA KEIICHI

(54) INK JET HEAD

(57)Abstract:

PURPOSE: To provide a low cost ink jet head by achieving both improvement of an yield and shortening of assembly time by a method wherein handling ability of parts is improved in an ink jet head using a piezoelectric element.

CONSTITUTION: The title ink jet head is composed of a first substrate 1 to which an ink passage having a nozzle 6, a pressure chamber 7 and a feed opening 8, and a common ink chamber 9 are provided, a second substrate 2 joined to an ink passage side surface of the first substrate 1, a conductive component of  $10\mu\text{m}$  or under 3 joined by preliminarily laminating onto the second substrate 2, and a piezoelectric element 4 to which a metallic plate 5 preliminarily joined onto the conductive component 3, is bonded.



LEGAL STATUS



[Date of request for examination]  
[Date of sending the examiner's decision  
of rejection]  
[Kind of final disposal of application  
other than the examiner's decision of  
rejection or application converted  
registration]  
[Date of final disposal for application]  
[Patent number]  
[Date of registration]  
[Number of appeal against examiner's  
decision of rejection]  
[Date of requesting appeal against  
examiner's decision of rejection]  
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PATENT ABSTRACTS OF JAPAN

(11)Publication number: 07178906

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18.07.1995

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B41J 2/055  
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(21)Application number: 05327501 (71)Applicant: RICOH CO LTD

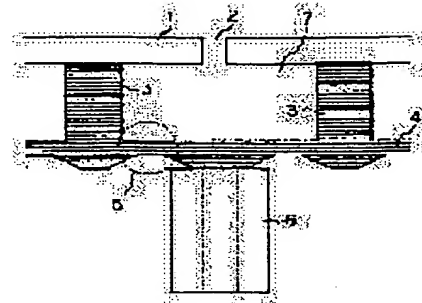
(22)Date of filing: 24.12.1993 (72)Inventor: HIRANO MASANORI  
HORIIE MASANORI  
HIROSE TAKESADA  
IWASE MASAYUKI  
NAKANO TOMOAKI  
AMEYAMA MINORU  
TSUNODA SHINICHI

(54) INK JET HEAD

(57)Abstract:

PURPOSE: To prevent adhesion inferiority generated by the warpage caused by the difference between the material of the partition wall of a pressure liquid chamber and that of a vibration plate or a nozzle plate or the use of an adhesive.

CONSTITUTION: Pressure liquid chamber 7 are respectively provided to a common ink chamber through a plurality of ink passages and a nozzle orifice 2 is provided to one end of each of the pressure liquid chambers 7. The volume of each pressure liquid chamber 7 is changed corresponding to a drive voltage signal (drive pulse) for recording data and a small ink droplet is ejected from the nozzle orifice 2 by this volume change. The partition wall 3 of the pressure liquid chamber 7 and a vibration plate 3 for generating the volume change of the pressure liquid chamber 7 are integrally molded by an Ni electroforming method. The vibration plate 4 has a diaphragm structure 5 and becomes easy to generate the deformation due to a piezoelectric element 6.



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[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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## PATENT ABSTRACTS OF JAPAN

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B41J 2/16

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B41J 2/055

(21)Application number: 08256480 (71)Applicant: CITIZEN WATCH CO LTD

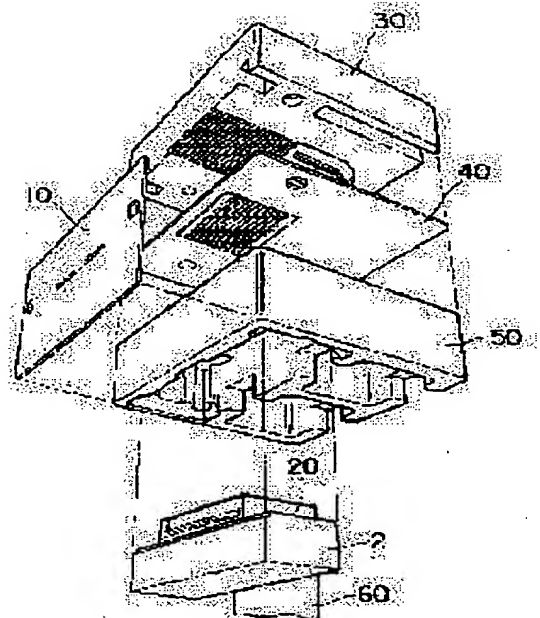
(22)Date of filing: 27.09.1996 (72)Inventor: TAKEHARA HISAHIRO

(54) MANUFACTURE OF INK JET HEAD

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an ink jet head in which the performance of a piezoelectric element can be derived sufficiently while suppressing internal stress due to bonding of different kind of material extremely by cutting a groove for separating bulk piezoelectric elements into individual drive elements down to an adhesive layer and the surface of a substrate member on the adhesive layer side thereby separating the piezoelectric element perfectly.

SOLUTION: After confirming that the bonding strength of an adhesive is sufficient for operating a piezoelectric element 20 after it is separated perfectly, a groove is cut down to the upper layer of a substrate member 2 and the piezoelectric element 20 is separated perfectly thus removing internal residual stress in the piezoelectric element 20 and the substrate member 2. Subsequently, a reference surface 2a for assembling is formed by grinding the substrate member 2 with reference to the groove cut in the preceding process and a conductor FPC 60 applying a voltage for driving each split piezoelectric element 20 is soldered to the opposite electrodes thereof. An actuator is completed under that state and a head is completed by bonding various parts and units furthermore.



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